

Claims

1. A modular electrical device comprising:

a modular base comprising a plurality of base components adapted to be arranged relative to each other so as to define a backplane comprising at least one module mounting location, wherein said at least one mounting location comprises a first electrical base connector of one base component and a second electrical base connector of another base component;

at least one removable module adapted to be respectively removably connected to said backplane in said at least one mounting location, said at least one module comprising: (i) a first module connector adapted to be mated with said first electrical base connector to form a mated pair of first connectors; and, (ii) a second module connector adapted to be mated with said second electrical base connector to form a mated pair of second connectors, wherein said module is adapted to electrically interconnect said first and second electrical base connectors of said at least one mounting location;

a coupling device connected to said backplane and located in said at least one mounting location, said coupling device adapted to releasably secure said at least one module to said backplane.

2. The modular electrical device as set forth in claim 1, further comprising:

a plurality of seals, wherein at least one seal is located between and sealingly engaged with said mated pair of first connectors, and wherein at least one seal is located between and sealingly engaged with said mated pair of second connectors to inhibit ingress of contaminants between said mated pair of first connectors and said mated pair of second connectors.

3. The modular electrical device as set forth in claim 1, wherein said at least one module comprises at least one coupling projection, and wherein said coupling device comprises a movable lock member that engages said at least one coupling projection.

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4. The modular electrical device as set forth in claim 3, wherein said lock member is movable between a locked position and a release position, and wherein said coupling device further comprises a spring for biasing said lock member to said locked position.

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5. The modular electrical device as set forth in claim 4, wherein said spring comprises at least one resilient finger projecting from said lock member, said at least one finger comprising a distal end secured against movement with said lock member when said lock member moves from said locked position to said release position.

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6. The modular electrical device as set forth in claim 5, wherein said lock member and said spring are defined as a one-piece polymeric construction.

7. The modular electrical device as set forth in claim 4, wherein said lock member comprises at least one ejection surface that engages and displaces the at least one module away from said backplane when said lock member is moved from said locked position to said release position.

8. The modular electrical device as set forth in claim 7, wherein said at least one coupling projection of the at least one module comprises first and second hooks projecting outwardly away from said module, and wherein said lock member comprises first and second latch portions that mate respectively with and engage said first and second hooks.

9. The modular electrical device as set forth in claim 8, wherein said at least one ejection surface of said lock member comprises first and second ejection ramps and wherein said first and second hooks comprise respective first and second ejection surfaces, wherein said first and second ejection ramps of said lock member bear
5 against said first and second ejection surfaces of said first and second hooks when said lock member moves from said locked position to said release position and urge said module to which said first and second hooks are connected outwardly away from said backplane.

10. The modular electrical device as set forth in claim 9, wherein the lock member of said coupling device comprises an actuator portion that extends outwardly from said backplane and is engageable with an associated tool.

11. The modular electrical device as set forth in claim 2, wherein each of said
15 seals comprises a radial sealing element for sealing radially adjacent surfaces and an axial sealing element for sealing axially adjacent surfaces for each mated pair first connectors and each mated pair of second connectors.

12. The modular electrical device as set forth in claim 11, wherein said first
20 and second base connectors are male plug connectors and wherein said first and second module connectors are female socket connectors.

13. The modular electrical device as set forth in claim 12, wherein said first
25 and second module connectors comprises a socket including one of said seals located therein.

14. The modular electrical device as set forth in claim 13, wherein each of said seals comprises a one-piece molded polymeric construction.

15. The modular electrical device as set forth in claim 14, wherein each socket comprises a plurality of flow passages, and wherein said seal is molded into and mechanically anchored to said flow passages.

5 16. The modular electrical device as set forth in claim 13, wherein said radial sealing element of each seal comprises at least one continuous radial lip that projects radially inward from a peripheral wall of said seal toward a central region of said socket, and wherein said axial sealing element of each seal comprises at least one continuous axial lip that projects from an inner wall of said seal axially outward toward an entrance
10 of said socket.

17. The modular electrical device as set forth in claim 16, wherein each of said seals comprises an L-shaped cross-section.

15 18. The modular electrical device as set forth in claim 11, wherein said first and second base connectors are female socket connectors and wherein said first and second module connectors are male plug connectors.

20 19. The modular electrical device as set forth in claim 1, wherein said at least one module comprises an outer housing and an inner housing received within the outer housing.

25 20. The modular electrical device as set forth in claim 19, wherein one of said inner and outer housings comprises projecting tabs and the other of said inner and outer housings comprises recesses that respectively receive said projecting tabs when said inner housing is received within the outer housing.

21. The modular electrical device as set forth in claim 20, wherein said outer housing comprises a continuously extending groove and said inner housing comprises a projecting wall that is received in said groove, wherein said projecting wall is adhesively secured in said groove.

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22. The modular electrical device as set forth in claim 1, wherein said base components comprise respective puzzle-piece structures that are mechanically inter-fitted with each other so as to define said backplane.

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23. A modular base for an electrical device, said modular base comprising:

at least two separate base components adapted for selective mechanical mating via corresponding male and female portions so as to define a backplane that comprises at least one module mounting location, wherein each of said at least two base components comprises at least one electrical connector, and wherein said at least one mounting location comprises first and second electrical connectors that form a part of respective first and second ones of said at least two base components.

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24. The modular base as set forth in claim 23, wherein at least one of said base components comprises a module coupling device that releasably engages and retains an associated module mounted to said backplane in one of said at least one mounting locations.

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25. The modular base as set forth in claim 24, wherein said coupling device comprises a spring-loaded lock member that moves between a first position where it retains an associated module mounted to said backplane and a second position where it releases an associated module mounted to said backplane.

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